THE
VETERINARY JOURNAL

Editor :
FREDERICK HOBDAY, C.M.G., F.R.C.V.S., F.R.S.E.,
HONORARY VETERINARY SURGEON TO HIS MAJESTY THE KING.
OFFICIERE DU MERITE AGRICOLE (FRANCE).
CAVALIERE DEI S. S. MAURIZIO E LAZZARO (ITALY).
HONORARY MEMBER OF THE AMERICAN VETERINARY MEDICAL ASSOCIATION.
AND FORMERLY PROFESSOR IN THE ROYAL VETERINARY COLLEGE, LONDON.

Sub-Editor :
GLADSTONE MAYALL, M.R.C.V.S.

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THE LATE MR. HARRY THOMPSON, M.R.C.V.S.

BORN in 1837, Mr. Harry Thompson has lived to see many revolutionary changes in the profession, and few men have done more to raise it in the respect of the agricultural community. In his own district, and indeed thoughout the county of Cumberland there was no veterinary surgeon whose opinion was more sought after and relied upon, and the respect in which his memory was held was well illustrated by the large and mixed gathering which attended the last ceremony.

Mr. Thompson graduated from the New College in Edinburgh, 1860, and served on the Council of the Royal College of Veterinary Surgeons from 1893 to 1896. A man of strong opinions, he was often very difficult to convince, and at times his views on different diseases led him into discussions from which he did not always emerge triumphant, but for sincerity of purpose and for energy and tact in instilling into the agricultural community the value of utilising veterinary knowledge early in the ailments of stock he had very few equals.

Harry Thompson's opinion on this point in his own district in Cumberland was the last word. His position as Secretary for more than 50 years of the Aspatria Agricultural Co-operative Society (of which he was also a founder), and as lecturer in Veterinary Science at the Aspatria Agricultural College, gave him enormous local influence, and the token of respect given to him last year on his retirement showed his popularity. His wonderful vitality lasted almost to the finish, and it may literally be said that although he was in his 84th year, he died, as he wished he might do, " in harness."

Editorials.

SALARIES IN THE INDIAN CIVIL VETERINARY DEPARTMENT.

THE depreciation in the purchasing power of money, which has increased the cost of living by fully 150 per cent., has fallen very heavily on the shoulders of the man with the fixed income and the Government servant is especially hard hit. Particularly does this come hard upon the recently-joined and junior ranks who are married. A certain "white man's status" has to be kept up; for the greater part of the year two homes have to be maintained, and, frankly, the situation is becoming impossible. Not only in the Indian Civil Veterinary Service has the pinch been felt, but in every Service alike, only that in the Medical and other Civil Services, owing to greater numerical and influential strings being pulled, the position has already been amended to an increase of nearly 50 per cent. on the pre-war rates of pay.

Only recently the advertisement columns of our veterinary periodicals have had announcements of appointments for qualified and selected men at 500 rupees a month, rising by annual increments of 50 rupees a month to 1,500; a certain number being then selected to go on to 1,750 rupees monthly. This salary is practically the same as was received in 1902, the only difference being that in those days the successful applicant received 40 rupees a month annual increment instead of 50 as now. This, when one considers the enormously increased cost of living, is not at all in proportion, and it is not so much the increased annual increment which is needed as a fairer salary at the commencement. This, to have progressed in proportion to other things, should be at least 50 per cent. higher; *i.e.*, to commence with the newly-joined officer should receive 750 rupees a month. The Indian Civil Veterinary Department has, in bygone days, been much sought after as one of the plums of the profession, but at present salaries and present prices it must deteriorate, for all who know the East know full well the impossibility of maintaining a white man's status unless a fair monetary recompense is allowed. It will be well for intending aspirants for all Eastern billets to go slowly and make every enquiry before taking the final plunge, recollecting well that, provided the candidates do not come forward, the salaries *must* be raised and made sufficiently attractive. No Government would dare to leave the stock of a country like India without the supervision of the man with a British veterinary qualification. We must not forget what caused the present efficient and satisfactory position of the Royal Army Veterinary Corps. When the pay and position were unsatisfactory the smart young graduates boycotted the service, and

if the situation is unsatisfactory other Services will find a shortage of efficient candidates too.

SOUTH AFRICAN UNIVERSITY VETERINARY DEGREES.

Our Colonies are giving us a lead in many things, and the Veterinary Profession has not escaped. The Australian Veterinary Faculty forms an integral part of the University both in Melbourne and in Sydney, and now the South African University has started its Veterinary School, too; and, with Sir Arnold Theiler as its leader, we may rest assured that it won't stand still, but will soon occupy the very important place it deserves. His address, published in this month's issue, forms most interesting reading and gives much food for thought. It displays over and over again the advantages of State Aid and of a University education, and makes one wonder why we in England are content to lag behind. Very soon, if we are not careful and do not come into line, the M.R.C.V.S. Diploma will be refused as a qualification to practice in the Colonies because of its lack of a University status, and it will be necessary to take the University degree in addition. It is quite time that our matriculation standing was again raised, so that we could say it was exactly the same as for human medicine, and there is much to be said in favour of the five years' course, " two years of which could be undertaken by any University or University College which provided the adequate staff and facilities for the teaching of the pure science subjects, and of Veterinary Anatomy and Physiology."

The Commission which sat in South Africa to consider the subject, recommended " that the final three years of more specialised professional training, following upon the two years' science curriculum or the three years' Bachelorate in Veterinary Biology, should lead to the degree of Bachelor of Veterinary Science in the University of South Africa, a professional degree enabling the graduate to follow the vocation of veterinarian in that country." A Doctorate of Veterinary Science of the University is also arranged for. This ought to make us think! South African Veterinary teaching will go ahead under the guidance of Sir Arnold Theiler just as much as Veterinary Research has done, for his name is a household word in every part of the world where veterinary science is practised.

ECONOMICAL USE OF FEEDING STUFFS.

In these days, when foodstuffs are so costly, anything which will tend to reduce the forage accounts and yet give good results is worthy of study. A practical paper, by Mr. J. J. Griffith, B.Sc., under the above heading, which appears in this month's issue, gives much food

for thought to the practical man, and illustrates well how those who feed stock scientifically can save very considerably, not only in the quality of the mixture, but in the actual out-of-pocket cost. This subject, too, is of great importance to the veterinarian, as he is very frequently called upon to advise upon the feeding of stock. In addition, too, inferior unknown mixtures are often a source of dietetic disorders, leading to illnesses and want of condition which would not occur if the basis of the mixture was good and wholesome. Meals and mixtures give such opportunity for working off second and third quality stuff and, as the author of the article states, the price at which they are sold is, to say the least, exorbitant when the prices of the separate ingredients are taken in detail.

VETERINARY RESEARCH AND EDUCATION IN SOUTH AFRICA.

ADDRESS BY SIR ARNOLD THEILER, K.C.M.G.

Director of Veterinary Education and Research, on Degree Day, Pretoria, 9th April, 1920.

It affords me great pleasure to have this opportunity of speaking for the first time in public on behalf of the newly-founded Veterinary Faculty, to explain its objects, its organisation, and its ideals. Veterinary science is, if not the last, at least one of the last sciences, the application of which has been recognised to be an important factor in the development of the stock-breeding resources of South Africa. The rough and ready methods used in the past to deal with plagues and diseases in stock have gradually given way to treatment based on scientific principles. As a result of this, the serious epizootics have been brought under control, and stock farming, which in earlier times was threatened by many perils, has finally become a safe undertaking. Everybody now realises that the future of South Africa lies in the development of agriculture, particularly in stock raising for the production of food and cloth to relieve the shortage of these commodities throughout the whole world. Improvement in the breed of cattle and sheep will come as a consequence of the increased demand, and of necessity the higher value of such stock will call for better care and attention as regards both the prevention and cure of disease. For some time past, farmers have recognised this, and have drawn the attention of the Government to the necessity of establishing a School of Veterinary Science in South Africa itself. They have realised that as far as stock diseases are concerned, this sub-continent has its own peculiar conditions, which are not met with in other parts of the world, and occur least of all in the older countries where the veterinary sciences are taught. They rightly conclude that no school in Europe can afford

South African students all the facilities required to make them thoroughly acquainted with their future work in South Africa.

In consequence of representations made by the Transvaal University College, the Minister of Education took up the question, and convened a meeting of persons interested in veterinary science, pure science, agriculture, and education, for the purpose of discussing the need for such a school, the advisability or otherwise of providing a course of training in South Africa, the extent to which university institutions generally could participate in such provision, and the centre at which the final professional stages of the course should be completed. This Commission realised that there was a shortage of veterinarians not only in South Africa, but throughout the world, and that the urgent and genuine necessity for meeting veterinary demands in South Africa was not likely to diminish in the future, but, on the contrary, was likely to increase with the inevitable expansion of the stock industry, and the more general application of intensive farming methods. The Commission, therefore, recommended the establishment of teaching facilities in this country, and set forth the advantages to be derived from such a course in the following words :

(1) The training received in this country would naturally be specially adapted to the needs of the stock-raising community and would embrace a consideration of important diseases peculiar to South Africa, which are not dealt with elsewhere with the emphasis that South African conditions require.

(2) It would afford facilities for South Africans desiring to enter the Veterinary profession, but who are at present debarred from doing so for financial or other reasons.

(3) The knowledge of South African conditions, both social and economic, possessed by those living in this country is a valuable asset to the professional man trained in South Africa, which is not shared by men coming from other countries.

(4) The due appreciation of the value of scientific research, and work of this character, is likely to develop more freely in the presence of a South African Veterinary College equipped with adequate facilities for education and research.

(5) It is held that the establishment of a South African Veterinary School would fulfil the national and international aspirations and obligations of this country to take an adequate share in the study and investigation of stock diseases peculiar thereto, and contribute its quota to the solution of scientific problems in connection with tropical diseases generally. Such an

institution would in process of time come to take a permanent place as an international centre for the study of diseases of this character.

(6) The training received by South African graduates would specially fit them for veterinary appointments throughout the African continent in places where a demand for such services may arise, as in British East Africa, Nyasaland, and Egypt, and probably also in India and the West Indies.

The Commission further recommended that the existing university institutions should participate in the education of veterinary students. A five years' course was finally considered to be necessary for complete training, two years of which could be undertaken by any University or University College that provided the adequate staff and facilities for the teaching of the pure science subjects, and of Veterinary Anatomy and Physiology. It also advocated the establishment of a Degree of Bachelor of Science in Veterinary subjects, which could be taken at a University or University College before entering upon the final three years' vocational professional training. It recommended that the final three years of more specialised professional training, following upon the two years Science curriculum or the three years Bachelorate in Veterinary Biology, should lead to the Degree of " Bachelor of Veterinary Science " in the University of South Africa, a professional degree enabling the graduate to follow the vocation of veterinarian in this country. The Commission furthermore recommended that provision be made for a Doctorate of Veterinary Science in the University.

With regard to the teaching of the professional subjects, the majority of the members of the Commission came to the conclusion that the most suitable establishment for this purpose was the Research Institute at Onderstepoort, and the " Majority Report " advocated that this Institute be converted into a " Faculty of Veterinary Science in the University of South Africa," the teaching staff to be so selected that the members would be at the same time actually engaged in the research work of the Institute.

In November last, the Government definitely decided to establish a Veterinary Faculty, and it accepted the " Majority Report " of the Commission. It decided that the faculty should form an integral part of the Transvaal University College, and as such of the University of South Africa, and that the third, fourth, and fifth years of the course be undertaken at Onderstepoort in conjunction with Veterinary Research. The Institute was to remain under the administration of the Department of Agriculture, which would make financial provision

both for the Research Institute and for the Faculty. In terms of the "Majority Report," the Cabinet decided that all the activities at Onderstepoort were to be under the ultimate control of one head.

The Premier, General Smuts, then asked me to undertake this control, and although at that time I had already made arrangements definitely to leave the service of the Government, I could not refuse to accept the task of organising the new undertaking, and thus show my sympathy with the South African student, and the educational ideals of the country.

This is a short outline of the history of the foundation and organisation of the new Faculty. In proposing the Faculty, the Commission appointed by the Minister aimed at a high standard of training. As already stated, a five years' course is contemplated, since even within the ranks of the profession itself it is felt that the period of training given in the past in the overseas schools is insufficient, particularly in view of special South African requirements. The Commission clearly realised that the veterinarian required in South Africa, and, indeed, in the whole sub-tropical and tropical world, would generally not be the private practitioner who attended the individual animal, but rather an officer in Government employ, who would apply the laws for the prevention of plague, and utilise his scientific training for the study of disease and of methods for eradication and control. In other words, although the practitioner training would be included, the South African students would have to be primarily equipped for research, and it is this view which determined the Commission to recommend provision for a more extensive instruction in the general sciences, the establishment of a science degree, the subsequent special training in connection with the Research Institute, and the creation of a Doctorate of Veterinary Science.

This new departure involved in combining research and teaching must be considered an excellent one, and South African farmers will in due time reap the full benefit of the extension of the activities of the Research Institute. The allotment of the subjects for research will be so arranged that they will fit in with the teaching function of the corresponding officer. On the one hand, the research officer will, by teaching, remain in constant touch with the literature of his subject as a whole, while on the other hand, the student will receive instruction from a teacher who masters his subject from the research point of view as well. Indeed, the combination of the two functions will be of the greatest benefit to research itself, and I venture to predict a period of constant progress in the near future, and the solution of problems which have hitherto proved refractory.

You will realise that under this arrangement the new school does not depend upon a large number of students to justify its existence, but will do useful work even if it should happen that there are very few students. The combination of research and education has a still further advantage, and one which will appeal to the people handling the purse strings. That is the saving of expense both in the construction of the new establishment and in subsequent current expenditure. The Research Institute as it now stands no longer fulfils the requirements for routine and research in the Union. Both have taken tremendous strides during the past few years, and for some time past an extension of the establishment has been contemplated. This extension can now be so arranged that provision is made at the same time for the educational side. For many years the research staff has been inadequate and its augmentation is necessary. A small increase over the estimated number of research officers, and a skilful distribution of the work, will now provide an adequate teaching staff. The professorial staff can be large without being expensive, owing to the fact that each teacher is not paid exclusively for teaching, but is primarily paid as a research officer. From the point of view of the State, the new organisation thus affords every guarantee for effective research and education at a moderate expense. From the point of view of the student, it is the most ideal one to be found. The young South African veterinarian will be a member of the University, and as such will derive all the advantages that the University life can offer. Students of the different faculties will meet on common ground and will rub shoulders with men whom in the future they will help to shape the destiny of the country. Furthermore, the student in the Research Institute will, from the very beginning of his studies, live in a scientific atmosphere. He will participate in the investigations of the professors. He will be able to follow their research, and to sharpen his critical mind during the progress of the work itself. It is the training of the critical mind, so necessary for the interpretation of facts obtained by observation and experiment, that makes a successful scientist.

Hence the new institute will afford opportunities superior to those of any other veterinary institute in the world.

At the same time, however, I wish to point out that not all and sundry will be welcome into our realm of science. Indeed, from the very beginning, I wish to utter a grave word of warning to those who consider the study of Veterinary Science only as a lucrative investment. I appeal to the young South African as the future veterinarian who, above everything else, has the welfare of the country at heart; to the young man who has the altruistic desire to be useful to his

fellow citizens ; and to the man who loves science for science's sake, who will be satisfied with a decent living, and will labour to elucidate the problems which are as yet unsolved. In doing so he not only serves the interests of his particular branch of science, but of science in general. It must be made clear to our student that veterinary medicine is a biological science, that the laws applying to the wider " science in general " are again to be found in the more limited regions of veterinary science, and that in approaching his subject from this wider point of view, he will be in a position to promote both. Whilst our science does not lend itself to the accumulation of wealth, it offers all prospects for distinction not only in our own country, but in the scientific world at large. For the gifted few there are places on the Roll of Honour of Science, but every honest veterinarian can become a great benefactor to the farming community of his country. It is to the student with high ideals that I appeal, and I feel sure that he is to be found in the young South African.

Clinical Cases.

SOME ACCIDENTAL PARASITES OF THE EAR OF THE DOMESTICATED RABBIT AND GUINEA-PIG.

By A. W. NOEL PILLERS, F.R.C.V.S.,
Liverpool.

C. J. Davies, in a recent communication to the Veterinary Journal,* made some remarks upon canker of the ear of the rabbit which practically proved that he was dealing with a case other than *Psoroptes communis cuniculi*, the common cause of canker in this species. I do not think, however, that his diagram or text proves conclusively that he had found *Tyroglyphus longior*. Prior to publishing his note he forwarded me two slides containing acari taken from the ear of a rabbit. All the undamaged specimens proved to be *Glycyphagus domesticus* de Geer. This finding formed the subject of a note in this journal.† Since then I have received numerous samples of foods and slides with specimens taken from rabbits and guinea-pigs' ears. From the lengthy account given I think Mr. Davies has established the fact that these mites are important in causing a marked set-back in condition and also an otorrhœa ; a Havana buck, kindly forwarded for observation, has convinced me

* Davies, C. J., Some Observations on Canker in the Ear of Rabbits. Veterinary Journal, Vol. 76, No. 3, March, 1920, p. 86.

† *Glycyphagus domesticus* (de Geer), an Accidental Parasite in the Ear of the Domesticated Rabbit. Vet. Journal, Vol. 76, No. 4, April, 1920, p. 126.

upon these points. The mites mentioned below are found in farinaceous materials except where it is otherwise stated; they may thus easily wander into the ear.

Systematic dressing of the ears with a weak liniment of carbolic acid, turpentine and tincture of opium in glycerin, and attention to the condition of the foods are troublesome, but satisfactory, measures against the irritation and infection.

The following photographs and brief notes are descriptive of the mites found :—

1. *Glycyphagus domesticus* de Geer was again encountered in the rabbit's ear, and also in the guinea-pig's. This species was illustrated in the previous record of its being found in the rabbit's ear.*

2. *Aleurobius farinæ*, Gervais. Several acari of this species were taken from the ear of the guinea-pig. I have encountered this mite several times in skin scrapings of horses.† Figs. 1 and 2 show the distinguishing features of both male and female.

Both the above mites belong to the family *Tyroglyphidæ*.

3. *Cheyletus eruditus*. A much larger mite was encountered in the guinea-pig's ear. It is a predaceous species belonging to the family *Cheyletidæ*. It feeds greedily upon *Aleurobius*, and is common in hay dust and seeds. Its bionomics and parthenogenesis have been fully described by Newstead and Duvall.‡ It has been blamed by Picaglia § as causing a skin eruption of the horse. See Fig. 3.

4. A fourth species of mite was found on four occasions, always, however, in a somewhat damaged condition. Prof. R. Newstead, F.R.S., who kindly examined some preparations of it, placed it in the family *Parasitidæ*, sub-family *Parasitinæ* near genus *Hyletastes*. Members of this genus are found upon certain beetles, and a few occur in moss. A fairly good specimen is shown in Fig. 4.

5. In one case several minute apterous insects were collected from the ear of a doe rabbit which had previously yielded acari. The specimens were damaged, and Prof. Newstead could only place them in the genus *Achorutes* of the Natural Order Collembola. The members of this group are found on grass, decaying wood, and in similar positions.

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* *Glycyphagus domesticus* (de Geer), an Accidental Parasite in the Ear of the Domesticated Rabbit. VET. JOURNAL, Vol. 76, p. 126, 1920.

† On the Occurrence of *Aleurobius farinæ* (de Geer) in Skin Scrapings of Horses. *Vet. Record*, Vol. xxxii., 1919, p. 22. London.

‡ Newstead and Duvall, Reports of the Grain Pests (War) Committee. Royal Society, London, No. 2, p. 10.

§ Picaglia, quoted by Raillet, A., "Traite de Zoologie Médicale et Agricole," 2 ème Edition. Paris, 1895, p. 696.

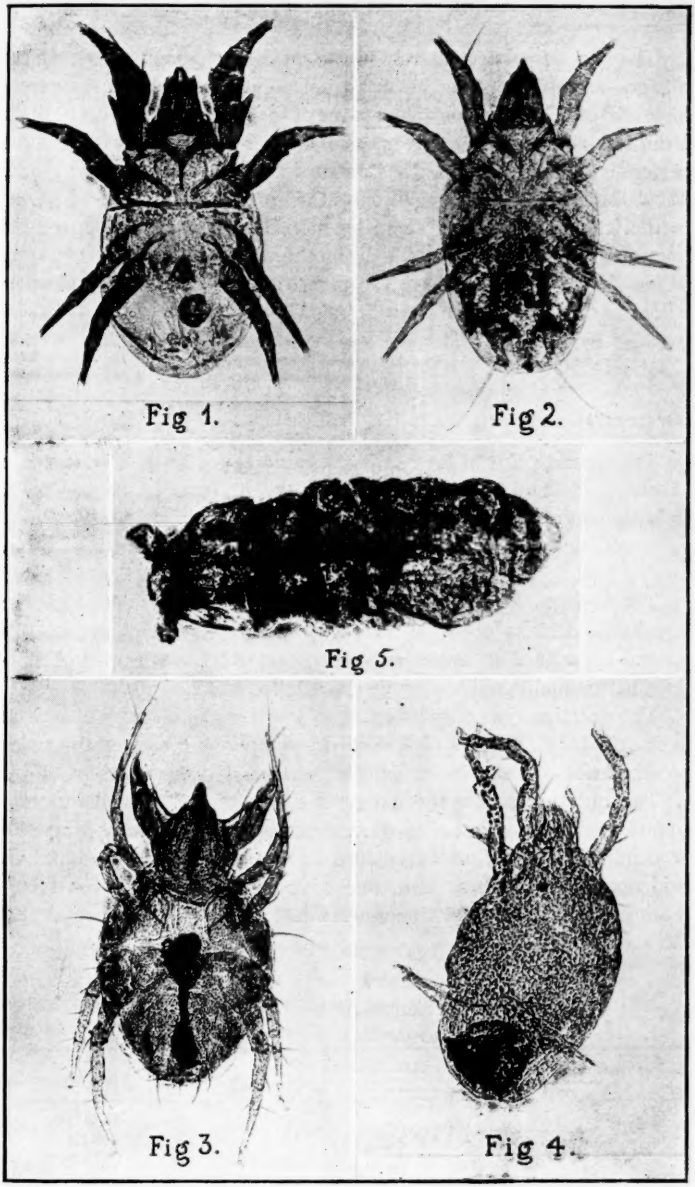


FIG. 1.—*Aleurobius farinæ*, male, ventral aspect. ×80. Note spur on first limb.
FIG. 2.—*Aleurobius farinæ*, female, ventral aspect. ×80.
FIG. 3.—*Cheyletus eruditus* ×70. FIG. 4.—Parasitinæ, ? near *Hyletastes*. ×140.
FIG. 5.—*Achorutes* sp. ×140. Nat. Order. Collembola (Insecta).

They are of passing interest in the microscopic diagnosis of equine mange—as it is easy for them to get on the horses' skin. Several members of the profession spoke to me of such finds in France, although I did not actually come across such a one. Fig. 5 shows the most perfect specimen found. In the VETERINARY JOURNAL for June, p. 238, Mr. Davies takes exception to the use of the word " accidental " in the title of a previous* note by me. He is, however, apparently unaware that an organism which, in the immense majority of cases, is found and flourishes in a non-parasitic state, is when found upon a host parasitologically " accidental."

SOME POINTS IN THE ROUTINE FEEDING OF MILITARY HORSES ON HOME SERVICE.

BY LIEUT.-COLONEL H. WATKINS-PRITCHFORD, C.M.G., R.A.V. CORPS.

(*Continued.*)

THE second point of interest is the rapidity with which an increase of weight follows the commencement of a system of boiled feeding. In both instances the response is prompt, while the rapid fall of weight ensuing upon the withdrawal of the boiled ration and its substitution by dry food is just as marked.

The experiment forms an illustration of the manner in which the so-called " dealer's condition " becomes established, and repeats the general experience of rapid loss of condition which ensues upon bringing such animal again under normal stable conditions.

The question naturally arises as to whether the increase of weight is due to true fat-deposition, etc., or whether it connotes the mere accumulation of water in the organs and tissues of the body.

The question is one the writer is now attempting to determine. In no animal of the late series of experiments was the increase of weight or condition so obvious as to furnish at post-mortem examination evidence likely to prove of a conclusive character. Long continued feeding with boiled food in quantity not exceeding the normal dry ration is necessary before speaking confidently upon this point.

SCHEDULE " A " (2).

Estimation of percentages of water, fat, etc., in the muscles of a fat and a thin horse.

	Fat Horse.	Thin Horse.
Specific gravity of blood	1056	1058
" " heart-muscle	1060	1067.5
Percentage water in Psoas-muscle ..	74.04%	75.90%
" fat " "	3.79%	3.17%
" nitrogen in urine	3.9%	3.9%

* *Glycyphagus domesticus* (de Geer), an Accidental Parasite in the Ear of the Domesticated Rabbit. VET. JOURNAL, Vol. 76, p. 126, 1920.

SCHEDULE "A" (3).

Scale of dietary given to twenty-two horses in the Raw *v.* Cooked Food test :—

	"Starch Equivalent"	True Protein.
Oats 9 lbs.	5.37 lbs.	.648 lbs.
Bran 2 lbs.	.96 lbs.	.222 lbs.
Hay 10 lbs...	3.1 lbs.	.38 lbs.
Totals 21 lbs.	9.43 lbs.	1.250 lbs.

The hay (whether long or in form of chaff) was scalded together with the oats and bran so that the total diet of the test horses consisted entirely of food which had been subjected to the action of heat.

SCHEDULE "A" (4).

THE AMYLOLYTIC ACTION OF EQUINE SALIVA.

Saliva was tested both before and after feeding, being collected by the means of washed sponges tied to the horse's bit after the animal's mouth had been cleansed. (This latter precaution was necessary, as sugar was demonstrated in the saliva of more than one horse some hours after feeding, being due presumably to an accumulation of small quantities of starchy food in the buccal cavity, and its conversion there into sugar.) · A 1 per cent. boiled starch solution was used and incubated for one hour with varying quantities of saliva, according to the following table. It was then tested with 10/N iodine for presence of starch, and with Fehling's solution for sugar or erythro-dextrose, as in the following table :—

	With 10/N Iodine (for Starch)			With Fehling's Solution (for Sugar).		
Horse No.	I. Saliva = parts	II. Saliva 50%	III. Saliva 20%	I. Saliva = parts	II. Saliva 50%	III. Saliva 20%
1	—	—	—	+	+	+
2	—	—	—	+	+	+
3	—	—	—	+	+	+
4	—	—	—	+	+	+
5	—	—	—	+	+	+
6	—	—	—	+	+	+
7	—	—	—	+	+	+
8	—	—	—	+	+	+
9	—	—	—	+	+	+
10	—	—	—	+	+	+

No unconverted starch was, therefore, found to be present in any of the tubes. In many cases a red colouration on the addition of iodine showed an incomplete conversion of the starch, the intermediate

LIBRARY ALABAMA

SCHEDULE "A" (5).

AVERAGES OF HEIGHTS AND WEIGHTS OF FIFTEEN HORSES AND MULES OF EACH CLASS.

Class.	Height.	Weight.
Heavy Draught	16 hands	1,282 lbs.
Light Draught	15.3 hands	1,188 lbs.
Riders (I)	15.3 hands	1,062 lbs.
Riders (II)	15.1½ hands and under ..	1,062 lbs.
Mules, Heavy Draught (average of five only) ..	17 hands	1,335 lbs.
Mules, Light Draught ..	15.2½ hands	1,087 lbs.

SCHEDULE "B" (2).

TABLE SHOWING AVERAGE TIMES OF CONSUMPTION OF WHOLE *v.* CRUSHED OATS.

Horse.	Whole Oats.	Crushed Oats.
No. 1	11 minutes	17 minutes
2	14 „	14 „
3	14 „	14 „
4	17 „	18 „
5	11 „	11 „
6	21 „	21 „
7	12 „	14 „
8	13 „	12 „
9	16 „	14 „
10	15 „	16 „
11	25 „	19 „
12	15 „	15 „
13	14 „	22 „
14	27 „	24 „
15	20 „	14 „
16	16 „	17 „
17	14 „	18 „
18	20 „	20 „
19	11 „	12 „
20	23 „	18 „
21	17 „	9 „
22	19 „	13 „
23	29 „	20 „
24	12 „	15 „
25	27 „	15 „

[Average for whole oats, 17.3 minutes; crushed, 16.1 minutes. The time taken by mules was slightly longer, 19.1 minutes. Where equal parts of whole and crushed corn was given (1½ lbs. of each) the time taken by the horse was 14.9 minutes, and by the mule 17.36 minutes.]

product—erythrodextrin—being present. In the presence of the greater proportions of saliva, however, the conversion was complete. In all cases Fehling's solution gave a copious precipitate. These results were obtained both before and after feeding. The quantities of saliva necessary to effect complete reduction were considerably greater than in the case of human saliva, but the presence of a starch-reducing enzyme was demonstrated in all cases.

It is probable that the discrepancy existing between the findings of this Institute and those of previous observers will be found due to the fact that the latter obtained saliva for testing by use of a Sialagogue, such as Pilocarpin, Arecolin, etc. A recent test has demonstrated that in the saliva collected by means of such reagents no ptyalin is found to exist.

Appendix "B" (3).

Table showing Degree of Vitality Possessed by Oats After Passage through Intestinal Canal of Horse.

Equal quantities (8 lbs.) of the mixed fæces of 24 hours were taken from ten horses, each being separately sown (by lightly digging the fæcal matter in) on ten plots of prepared earth. The oats which germinated were then counted. The numbers of oats germinating seem to vary within wide limits, but the proportion borne to the approximate number of oats ingested—approximately 160,000 grains in 8 lbs. of oats—is very small. Such differences as exist are due probably to differing degrees of efficiency of mastication in the animals under observation. (Where a horse's teeth were believed to be out of order, but no competent dental inspection was available, this germination test might be made to furnish a rough gauge of the state of the teeth.)

Average Number of Vital Oats in 24 hours Output.

Horse No. 12	..	..	15	Horse No. 42	..	..	110
Horse No. 36	..	..	22	Horse No. 45	..	..	37
Horse No. 37	..	..	21	Horse No. 47	..	..	120
Horse No. 38	..	..	28	Horse No. 48	..	..	22
Horse No. 39	..	..	10	Horse No. 49	..	..	27
				Horse No. 50	..	..	57

Schedule "B" (4).

Table showing Percentage of Oats—When Fed Uncrushed—which Pass Through the Bowel of the Horse and Escape Digestion.

Coloured oats of known number (2,050) were used in this test, and their times of first and last appearance noted as shown :—

Horse No.	First Seen.	Last Seen.	% of Whole Oat.
11	22¼ hours	132 hours	.098
11	22½ ,,	123 ,,	.1463
12	21½ ,,	96½ ,,	.975
32	20 ,,	118 ,,	.634
32	20 ,,	101 ,,	2.10
32	20 ,,	82 ,,	2.24
32	20 ,,	68 ,,	1.6
32	17½ ,,	74 ,,	.68
32	19 hrs. 45 mins.	77 ,,	.146
32	21 hours	68 ,,	.390
32	20 ,,	66 ,,	.780
32	20 ,,	56 ,,	.390
32	19 ,,	68 ,,	.195
33	22 ,,	78 ,,	.536
33	20 ,,	94 ,,	1.073
33	22 ,,	95 ,,	1.12
33	21 ,,	100 ,,	.635
33	20 ,,	87 ,,	1.12
33	20 ,,	81 ,,	.243
33	19 hrs. 35 mins.	84 ,,	.097
33	20 hours	60 ,,	.390
33	20 ,,	68 ,,	1.21
33	20 ,,	61 ,,	.439
33	18 ,,	68 ,,	.097

Schedule "B" (5).

Showing the Result of Absence of Teeth-action upon the Digestion of the Oat.

In order to determine this point two horses received a bolus containing about 1,000 coloured oat-grains. By introduction in this way into the stomach direct the effects of mastication were avoided.

		No. 52.	No. 57
July 23	Between hours of 6 a.m. and 9 a.m.	2	nil
,, 23	,, ,, 9 ,, and 12 noon	1	2
,, 23	,, ,, 12 noon and 3 p.m.	nil	6
,, 23	,, ,, 3 p.m. and 6 p.m.	14	1
,, 23	,, ,, 6 p.m. and 9 p.m.	6	nil
,, 23-24	,, ,, 6 a.m. and 9 a.m.	13	12
,, 24	,, ,, 9 a.m. and noon	13	13
,, 12	,, ,, 12 noon and 3 p.m.	34	24
,, 12	,, ,, 3 p.m. and 6 p.m.	20	33
,, 12	,, ,, 6 p.m. and 9 p.m.	158	24
,, 24-25	,, ,, 3 p.m. and 6 a.m.	110	72
,, 25	,, ,, 6 a.m. and 9 a.m.	—	—
,, 25	,, ,, 9 a.m. and noon	69	65
,, 25	,, ,, 6 p.m. and 9 p.m.	42	34
,, 25	,, ,, 3 p.m. and 6 p.m.	37	24
,, 25-26	,, ,, 9 p.m. and 6 a.m.	80	75
,, 25-26	,, ,, 6 a.m. and 9 a.m.	48	36
,, 25-26	,, ,, 9 a.m. and noon	55	42

Whole coloured grain began to appear at times as shown in the table. During the test the horses were fed at the usual times and in the usual manner. The bolus was administered at 4 p.m. on July 22.

The experiment was discontinued at this point, as no evidence of any digestive action upon the grains appeared to be exerted, all the oats as shown in the above columns being whole and no signs of disintegration having occurred.

Appendix "C" (1).

Average Time in Minutes Taken in Consuming Feeds.

Horse No.	Friday. 4 lbs. of whole Oats, 2 lbs. Chaff at each feed.		Monday. 4 lbs. Crushed Oats, 2 lbs. Chaff at each feed.		Tuesday. 4 lb. Whole Oats each feed. No Chaff.		Wednesday. 4 lbs. Crushed Oats each feed. No Chaff.	
	M.	E.	M.	E.	M.	E.	M.	E.
12	53	53	51	48	26	23	22	22
54	52	53	42	46	22	19	16	14
55	47	50	42	41	20	18	20	19
56	54	53	72	55	46	25	43	29
49	40	41	35	31	16	15	12	11
52	34	30	34	34	13	13	12	12
57	52	52	70	49	24	22	21	20
53	50	54	48	50	23	19	23	19
58	51	52	49	42	21	17	19	21

Average Time.

Morning feed of whole grain—chaff	..	48 mins.
Evening feed of whole grain—chaff	..	47 mins.
Morning feed of crushed grain—chaff	..	50 mins.
Evening feed of crushed grain—chaff	..	44 mins.
Morning feed of whole grain without chaff		23½ mins.
Evening feed of whole grain without chaff		19 mins.
Morning feed of crushed grain without chaff		21 mins.
Evening feed of crushed grain without chaff		18½ mins.

Daily average time with chaff, 47 minutes.

Daily average time without chaff, 20 minutes.

Schedule "C" (5).

Effect of Exercise on the Rate of Passage of Ingesta through the Digestive Tract.

Four horses (Nos. 12, 49, 53 and 54) were given ¼ lb. of red oats (stained by carbol fuchsin) at 6 a.m. (19.8.19). Two of these (12 and 49) were given sharp exercise for two hours and made to sweat profusely (9.30 a.m. till 11.30 a.m.).

The fæces were collected and marked at understated times and the red oats picked out :—

Time examined.	12	49	53	54
12th hour	Nil	Nil	Nil	Nil
15th hour	7 red oats	2 red oats	1 red oat	Nil
18th hour	No fæces passed	18 red oats	No fæces passed	Nil
21st hour	50 red oats in ½ lb. fæces	23 red oats	1 red oat	No fæces passed
	Not counted further	Not counted further		
24th hour	..	..	1 red oat	Nil
27th hour	..	..	18 red oats	18 red oats
			Not counted further	
30th hour	..	..		33 red oats in ½ lb. of fæces.
	Horses exercised.		Horses not exercised .	

The above table shows the accelerating effect of exercise upon the gastro-intestinal contents. It appears possible that a connection may frequently be shown to exist between poor condition, general unthriftiness, and this factor of the time taken in the transit of ingesta through the bowel. Observations controlling the point are now in hand.

Schedule "C" (6).

To Test the Rate of Feeding of Bran and Oats in Comparison with Chaff and Oats.

Eight horses (Nos. 12, 54, 55, 56, 49, 53, 58 and 52) were fed on bran and oats, having 2 lbs. of each. Same horses fed on a different day, at same time of day, on chaff and oats, having 2 lbs. of each.

Time Table.

No. of Horses.	Bran-Oats.	Chaff-Oats.
12	24 mins.	35 mins.
54	17 ,,	28 ,,
55	20 ,,	22 ,,
56	32 ,,	41 ,,
49	13 ,,	24 ,,
53	20 ,,	33 ,,
58	19 ,,	29 ,,
52	13 ,,	24 ,,
Totals ..	158 mins.	236 mins.
Average time for each horse	19.75 mins.	29.50 mins.

SSHEDULE A, No. 1.

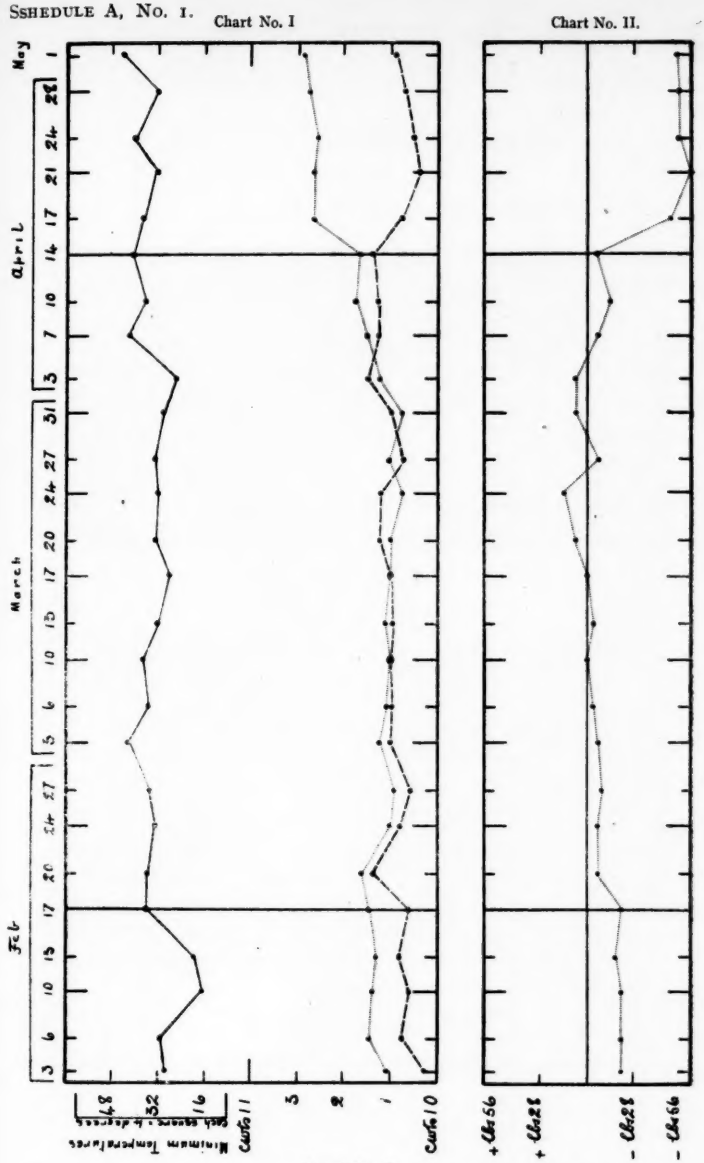


CHART No. I.

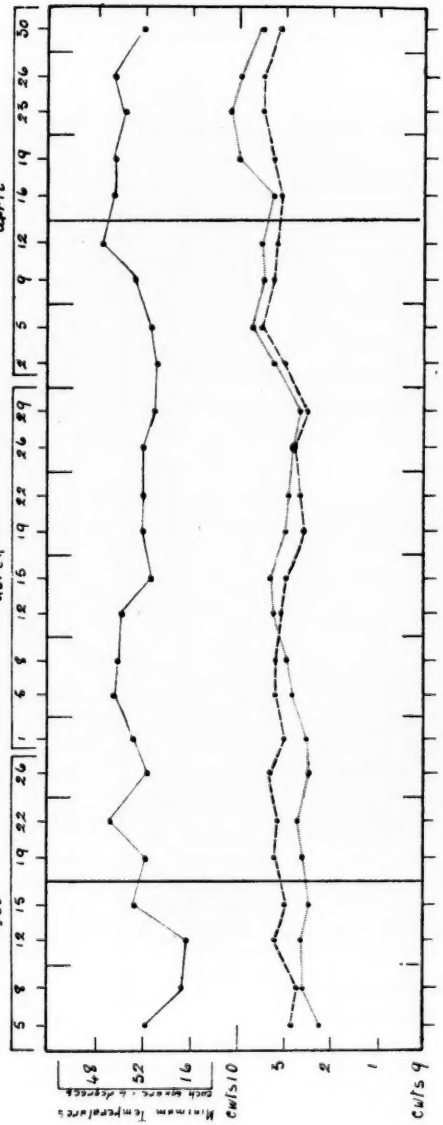
This Chart shews the average weights of ten Test horses (the heavier dotted line) fed upon boiled food, and ten Control horses (the lighter dotted line) receiving an equal (original) weight of raw food. A preliminary period of observation, Feb. 3 to 17, was observed to allow normal conditions to become established. The experiment commenced Feb. 17 and conditions of feeding were reversed on April 14, weights being recorded every 3 and 4 days.

CHART No. II.

This Difference Curve is intended to shew the variations occurring in the weights of the Test and Control animals, the approach to or receding from the horizontal line shewing the degree of difference—in pounds—at any given date.

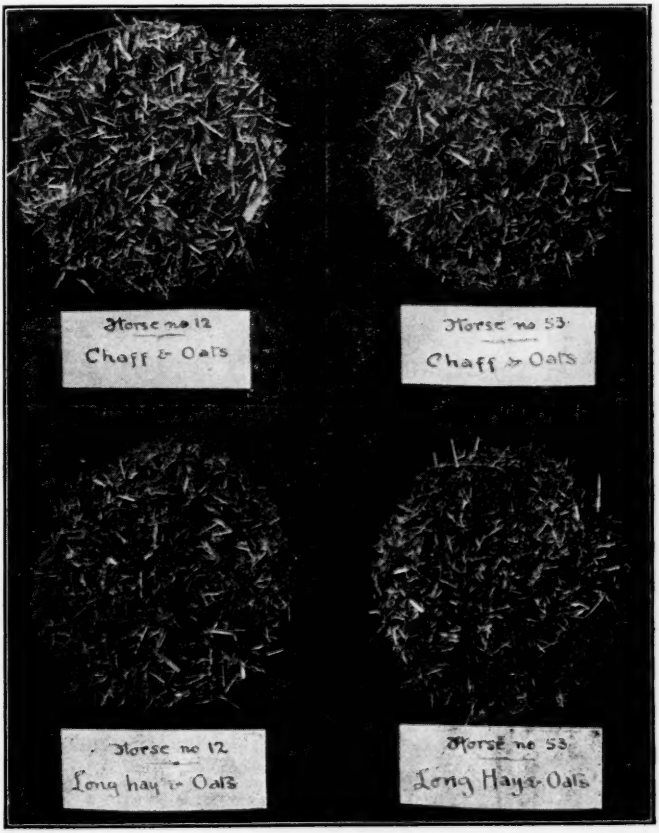
SCHEDULE B1.

CRUSHED *v.* WHOLE OATS.



The Heavy Curve indicates Whole Oats until the change over on April 14.

C2.

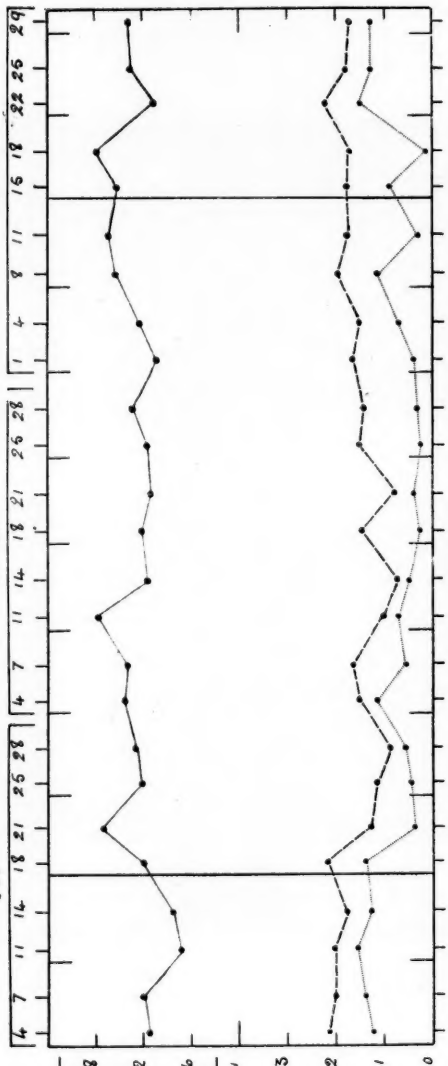


Photograph of residual fibre in fæces of horses a[illegible]eeding with Long Hay, and Chaff, respectively.

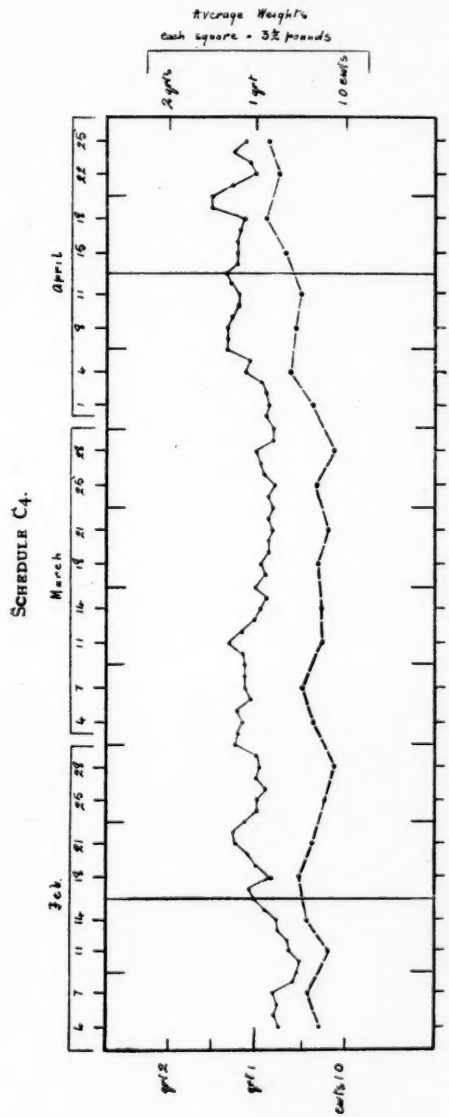
The Chaff was cut from the same bale of Hay as fed in the long state.

SCHEDULE C, No. 3.

LONG HAY *v.* CHAFF



The upper of these two curves indicates Chaff weights until the change over on April 14.



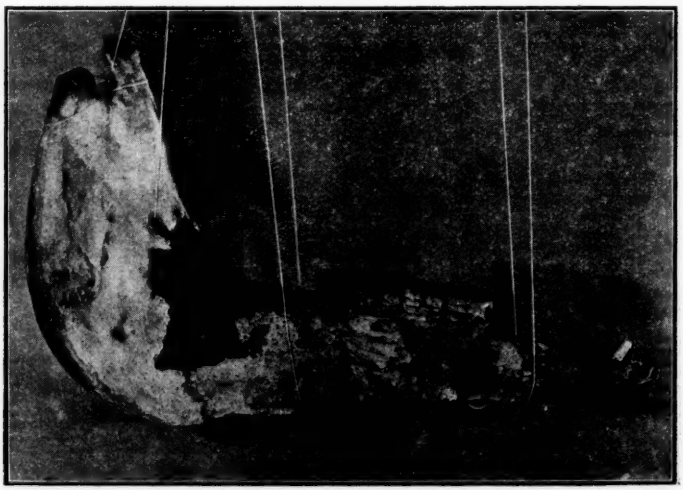
A Composite Chart of Weights of 60 Test and Control Horses, tending to shew—within wide limits—a possible correspondence between an increase of daily temperature (top curve) and an increase of body-weight (bottom curve).

A CURIOUS CASE.

By G. MAYALL, M.R.C.V.S.,
Bolton.

On May 19 I was called to attend a 7-year-old cart gelding for a swollen right lower jaw bone and face, and which was dropping clotted blood from his mouth on the floor of the loose box. I found the jaw swollen as stated and saw the blood clots on the stall floor. The horse strongly resented any examination of the mouth, but I managed to syringe the inside of the right cheek and the back of the pharnyx out well with dilute Bacterol (Menley & James) and left a large pot of boracic electuary to be smeared in the mouth. There was also a swelling on the left side of the horse which was raised and flattened, about 6 inches in diameter, and situated over the ninth rib. Some emollient liniment was left to be rubbed on the swelling.

On May 25 the horse was reported no better, so it was decided to cast him, and thinking I should have a defective molar to deal with, I took my tooth rasp, forceps, gag and chloroform muzzle. The subject was cast on the off side and the gag inserted, and on examining the mouth I found the inside of the right cheek considerably abraded, and the edges of the molars sharp, but the teeth themselves were firm and with no interdental spaces. I rasped them well, and caused some slight hæmorrhage in so doing ; I then syringed and swabbed the mouth out with antiseptic, let him up and advised that he be let out to graze, This was done right away and he proceeded to eat the grass very well. At no time during the illness did the horse " quid " his food. I



visited him further on May 27, June 1–8 and 15, dressed the outside of his jaw several times with iodine ointment and gave him laxatives and sedative electuaries. Externally the swelling reminded me of a malignant œdema case, but on June 8 it had burst and was discharging dirty sanious pus (not of a yellow colour, however). Although the horse kept on eating to the last, he gradually got thinner and thinner and died on June 30. The parting with the clots of blood recurred from June 8.

P.M. revealed the right cheek abraded inside, all the teeth intact, but the jaw bone smashed as illustrated in the accompanying photo. The ninth rib was broken and eaten away for about an inch and a tumour of organised blood opposite it and bulging out the peritoneum. The blood tumour weighed 1 lb. 8 oz. A big ante-mortem clot of blood in the heart weighed 1 lb. 10 ozs. Without the post-mortem the case might have been taken for one of alveolar disease. The horse keeping on eating until the last somewhat negatived this and the examination when cast revealed no dental trouble.

I have seen one other similar case due to the point of a shaft catching the side of a horse's under jaw and the sites of the injuries, too, are the places where an unruly horse sometimes gets a smack with the hammer when being shod, and this horse was a very awkward one. The three teeth absent in the photo came out during the process of boiling. I could gain no history of any accident or injury, but I think that some cases of sudden swelling in horse's heads are due to external blows, either accidental or otherwise.

OVARO-HYSTERECTOMY OF A GANGRENOUS UTERUS.

By J. B. WALKER, M.R.C.V.S.,

Slough.

Subject.—Aberdeen terrier bitch, three years old.

History.—Bitch, one month in whelp, was run over by a motor car on November 25 ; as she did not seem any the worse for the accident no professional advice was sought. On December 9, as the bitch did not appear to be quite herself, a 'phone message was sent asking me to call. The bitch appeared fairly normal, except that abdominal walls were somewhat tense, and that uterus was considerably enlarged, although no definite fœtus could be felt. The temperature at this visit was 101.4.

The bitch continued without any change noticeable to the owner until December 12, on which day at 9 p.m., a telephone message was received to say that bitch appeared very uneasy, and had been sick and thirsty all day.

On arrival, symptoms of severe abdominal pain were noticeable ; there was a stinking coffee-coloured discharge from vagina, and pains indistinguishable from labour pains were to be seen.

On examination it was found that os uteri was only sufficiently open to permit the introduction of a very small probe. From external manipulation one could diagnose the presence of a large amount of fluid in both horns of the uterus. The temperature was 104.

It was decided that the accident had caused the death of the fœtuses, and subsequent mortification of the uterus, and that the only hope of saving the bitch was to perform ovaro-hysterectomy.

The bitch was therefore removed at once to my infirmary, and operated on immediately on arrival.

Operation.—The bitch was placed in the dorsal position on operating table, and skin was shaved and painted with tincture of iodine. Chloroform was administered ; skin and abdominal muscles divided in the midline. A pair of retractors applied to divided surfaces, and peritoneum incised a little to left of median line.

It was then observed that both horns of the uterus were gangrenous and that the peritoneum in apposition to the horns was acutely inflamed.

The horns of the uterus were divided from the ovaries and drawn through the wound, which was protected from contamination by a pad of sterile cotton wool. The cornua were then divided from the body, great care being taken to prevent any fluid escaping into the abdominal cavity. The edges of body of uterus were turned inwards and secured with a purse suture, the body afterwards being attached by a suture to the abdominal wall.

The peritoneum was washed with a 2½ per cent. solution of tincture of Iodine, the stump of body of uterus being dressed with a 10 per cent. solution of same agent.

The wound was now stitched up, three drainage tubes being introduced as follows : (1) At posterior end of wound, immediately under the stump of the uterus ; (2) at centre of wound ; (3) at anterior extremity of wound.

After the stitched areas had been painted over with iodoformed collodion, a dry antiseptic pad and supporting bandage were applied. The remnant of genitary passage was syringed with a 1-1,000 solution of Chinosol, and a pessary of salol and iodoform introduced.

Six hours after the operation, the temperature was 102 ; the bitch appeared quite comfortable, and took a little nourishment of her own accord.

At twelve hours, the bandage was removed ; very little discharge had occurred, and even that was of quite a mild nature. The surfaces

of the wound in apposition to the drainage tubes were dressed with tincture of iodine.

At twenty-four hours the two anterior drainage tubes were removed, and the edges of the wound dressed as before. A slight discharge was still escaping from the posterior tube.

The progress continued unchecked, and on the fifth day the last tube was removed, the wound closing perfectly.

The discharge from vagina, which had been rather copious and disagreeable, diminished gradually and was not noticeable after the fifth day.

A liquid diet was maintained for a week ; the patient gave all the assistance in this direction that could be desired.

Recovery was complete in three weeks, the bitch leaving for home on January 3.

PATENT ANTERIOR FONTANELLE IN A LITTER OF BERKSHIRE PIGS.

By J. F. D. TUTT, M.R.C.V.S., F.R.M.S., F.Z.S.
Winchester.

THE occurrence of patent fontanelle in the newly-born in the case of domesticated animals must be regarded as rare, and no reference as to their existence either before or after birth appears to have been made in any current anatomical treatise on veterinary anatomy.

In human anatomy, and midwifery, the fontanelles are important, and are six in number, some remaining patent after birth for a considerable period, the anterior not closing till some time in the first half of the second year, or even later.

The writer has known of patent fontanelle occurring in the calf, but has not before encountered a case in the pig, and this particular case appears rather unique, inasmuch that the whole litter was affected to the same degree.

The owner, in seeking advice, stated that six weeks previously one of his Berkshire sows had given birth to a litter (eight) of pigs that had " bumps " on their heads.

The elevation was semi-solid, and situated at the junction in the middle line of the parietals with the frontals.

Post-mortem on a dead pig easily showed the condition, the fontanelle being about the size of a threepenny piece, with underlying cerebral tissue and dura mater pressing up against it.

The majority of the pigs died, and those remaining never " did well " and were destroyed.

RUPTURE OF UTERUS IN A COW.—A WARNING.

By HENRY B. EVE, M.R.C.V.S.
Folkestone.

Subject.—A half-bred shorthorn cow, about six years old, in fair condition.

History.—Some few weeks ago I was called to see the above, which was said to have been off her feed for some days, and constipated. The animal had calved twins, one alive, the other dead, delivered by his cowman with some difficulty about ten days ago ; the latter was so clever that he never required the aid of a vet. for parturition or milk fever cases, or ordinary ailments, but he admitted he was clean "licked" with this cow, and was at a loss to understand the continual moaning and grunting. The owner and he had given various patent medicines —in fact, nearly a chemist's shop. The cowman had removed the fœtal membranes in his usual manner, namely, with a couple of thatch pegs, and twisted until he had got both cleansings away. The cow had ever since arched her back, strained and discharged from the vulva a brownish coloured fluid, which was foul stinking.

Examination.—The pulse was very weak, almost imperceptible ; temperature, sub-normal ; eyes sunken. On proceeding to examine the uterus, I found the os dilated, and a bit further on the left side towards the floor of the womb, a rupture large enough to admit my hand. I passed my hand through, and felt the bowels and bladder. On the right side I discovered the remains of some placental membranes which I removed manually. I then explained the condition to the owner, and assured him, with no little confidence, the cow would die, and felt chary about putting him to any expense in treating. However, we contracted for a fee, a guinea cash down, and I treated accordingly, the result of which gave me a very rude shock. It recovered in three weeks.

Treatment.—I mopped out the uterus with a tampoon medicated with Chinosol and Ext. Belladonna solution, and instructed the cowman to do this twice daily as long as she lived ; packed the same all round, and attached a string to tampoon to remove ; gave internally whisky, eggs, and milk and gruel, and stimulating drinks, ammon. carb., quinine, and vegetable tonics, and went home rejoicing that I had got the fee in advance.

Remarks.—I did not revisit as it was some distance in the country, and as I heard nothing, of course concluded she had died. Imagine my surprise when I saw the cowman a few days later, who laughed and said, "Well, Guv'nor, the old coo soon stopped moaning, and ain't dead ; we are fattening her for the butcher, and don't mean to

breed from her again." I vowed then and there I would never express any other opinion in future but while "there is life there is hope."

N.B.—The rupture, I think, was caused by the hind legs of one of the calves, or else due to sloughing of the uterus.

Original Communications.

ECONOMICAL USE OF FEEDING STUFFS.

By J. J. GRIFFITH, B.Sc.,
Lecturer and Adviser in Agricultural Chemistry, University College of Wales.

THE proper selection and utilisation of feeding stuffs is at all times a matter of considerable economic interest to the farmer. At the present time the subject has acquired exceptional importance as a result of the great advance in the market prices of the feeding stuffs which farmers usually purchase. Further, the country is confronted with the necessity of husbanding its resources in all possible ways, especially in matters pertaining to the food supply.

In this leaflet attention is drawn to a few of the ways in which farmers might

(*a*) use their home-grown foods to better advantage;

(*b*) make a more judicious selection of purchased feeding stuffs and thereby avoid incurring much wasteful expenditure.

FOOD CONSTITUENTS AND THEIR FUNCTIONS

(Or the different substances which foods contain and the use of each substance to the animal).

Every farmer knows from experience that there is a great variation in the feeding value of different foods usually supplied to farm stock. For instance, everyone knows that, as regards nutritive value, a ton of good hay is superior to a ton of cereal straw. But, in order to make the best and most profitable use of the feeding stuffs at his disposal, the farmer must acquire some knowledge of their chemical composition.

Chemical analysis shows that all feeding stuffs contain the following ingredients :—

Water.

Albuminoids—Sometimes called proteins or flesh-formers.

Oil.—Also called fat.

Carbohydrates—A name given to a class of substances of which starch and sugar are the most important members.

Fibre—For practical purposes this may be regarded as indigestible carbohydrates.

Ash—Also called mineral matter.

The most important functions of these constituents may be summarised as follows :—

Food Constituents.	Functions.
Albuminoids.	Form flesh, muscle or lean meat. Also produce the albuminoids of milk.
Oil and Carbohydrates.	Produce heat to keep up the temperature of the animal. Serve as a source of energy to enable the animal to perform work. Produce fat to be stored in the body of the animal.
Ash.	Assists in the formation of bone and other substances in the animal body which contain mineral matter.
Fibre.	Generally speaking, the fibre of food does not possess much direct value, but it has a considerable indirect influence upon the value of many foods.

Most foods, and especially most mixtures of foods constituting the daily rations of farm stock, contain a sufficient amount of ash to meet the requirements of the animal. Consequently, so far as the chemical composition is concerned, the relative values of different feeding stuffs depend upon the amount of albuminoids, oil and carbohydrates they contain.

In order to obtain the best financial return in feeding, it is essential that the correct amount of each food constituent be supplied to each animal in its daily ration. Generally speaking, the presence of an excessive amount of one constituent in a diet cannot be taken as a remedy for a deficiency in the amount of another constituent. Consequently, it is of the utmost importance for every farmer to have some idea of how the relative proportions of the food constituents should be varied according to the class of animal to be fed.

The following generalisations, considered in conjunction with the percentage composition of foods as given in the table on page 353, may provide some guidance for the selection of feeding stuffs best suited for different classes of animals.

1. Rations containing a high percentage of albuminoids are needed for—

(*a*) young growing animals ;
(*b*) fattening animals (especially during the first stage of fattening) ;
(*c*) dairy cows (particularly for cows supplying a big yield of milk).

2. Rations of low albuminoid content are suitable for—

(*a*) store animals ;
(*b*) horses (especially when not performing very hard work) ;
(*c*) adult animals in the last stage of fattening.

3. It is advisable to provide foods fairly rich in oil to—

(*a*) very young animals ;

(*b*) fattening animals.

4. Care should be taken to avoid excessive use of foods deficient in ash for young animals.

5. Rations with low fibre content should be provided to—

(*a*) very young animals ;

(*b*) fattening animals ;

(*c*) working horses.

6. Rations containing a high percentage of fibre may be supplied to ruminant animals, especially those in a store condition.

AVERAGE COMPOSITION OF FOODS.

Food.	Water.	Albuminoid.	Oil.	Carbohydrate.	Fibre.	Ash.	*Food Units.
Earthnut Cake (decorticated) ..	11	47	8	24	5	5	161
Soya Bean Cake	12	43	6	28	5	6	150
Decorticated Cotton Cake ..	10	40	9	27	7	7	149
Undecorticated Cotton Cake ..	11	22	5	34	22	6	101
Linseed Cake	12	29	9	35	9	6	130
Linseed	12	21	37	20	7	3	165
Cocoanut Cake	12	20	9	38	16	5	110
Palm Kernel Cake	9	18	8	37	24	4	102
Beans	14½	26	1½	47	8	3	116
Peas	15	22	1½	53	6	2½	112
Gram Meal	10	20	5	52	10	3	114
Wheat Bran	14	14	3½	55	7½	6	98
Wheat	13	12	2	68	3	2	103
Oats	13	12	6	56	10	3	101
Barley	13½	10	2	67	5	2½	97
Maize	13	10	5½	68	2	1½	107
Wheat Straw	14	3	1	37	40	5	
Barley Straw	14	3½	1½	37	39	5	
Oat Straw	14	4	2	39	36	5	
Meadow Hay	15	9	2½	40	27	6½	
Clover Hay	16	12	2½	36	27	6½	
Bog Hay	9½	7½	2	50	28	3	
†Gorse	48	6	1¾	20	22	2¼	
Pasture Grass	80	3	¾	9	5	2¼	
Turnips	92	1	¼	5	1	¾	
Swedes	89	1¼	¼	7	1½	1	
Mangels	87	1¼	¼	9	1½	1¼	
Sugar Beet	80	1½	¼	16	1½	1	
Sugar Beet Pulp or Slices (dried) ..	10	7	1	62	17	3	
Do. do. (wet) ..	91	¾	¼	5¾	1½	¾	
Potatoes	74	2	¼	22	¾	1	
Locust Beans	14	6	2	70	6	2	
Treacle (from Beet)	21	9	—	60	—	10	

* See page 351.

† A special leaflet on " The Use of Gorse as Food for Farm Animals " may be obtained on application.

"Balanced" Rations.

A ration is said to be suitably "balanced" when it contains the proper *relative* amounts of albuminoids, oil and carbohydrates to meet the requirements of the particular animal to which it is to be supplied, and, in addition, is neither too "binding" nor too "laxative." The use of rations which are not properly balanced involves much waste of food and money.

Selection of the Most Suitable and Economical Concentrated Foods.

A general consideration of the systems of feeding in vogue in various districts within the College area shows that the type of rations commonly adopted might be very greatly improved and at the same time made much more profitable. Such improvement could often be effected with little or no additional expenditure and, in some cases, even with considerable curtailment of expenditure. It is often found that the food supplied to the animals cannot give a satisfactory monetary return on account of—

(*a*) the excessive prices unnecessarily paid for the purchased concentrated foods;

(*b*) the lack of proper "balance" in the rations.

In many districts farmers have been accustomed to rely entirely upon wheat offals, maize and compound meals for their choice of purchased feeding stuffs. In other localities linseed cake and cotton cakes may be obtained in addition to those already mentioned. But in order that the most efficient and profitable methods of feeding may at all times be possible, supplies of earthnut cake, cocoanut cake, soya bean cake, palm kernel cake, gluten feed, gluten meal, maize germ meal, gram meal and any other type of feeding stuff on the market in other parts of the country should be obtainable in every district. The farmer should bear in mind that when there are only a few concentrated foods obtainable in his district he is unable to take full advantage of the fluctuations in the market prices of the various feeding stuffs. To illustrate the importance of this question we may consider the case of a farmer who needs a supply of a feeding stuff containing a high percentage of albuminoids. As regards composition and feeding properties earthnut cake and decorticated cotton cake are somewhat similar. Both contain over 40 per cent. of albuminoids. In other words these two feeding stuffs are interchangeable in making up rations. During the past few months the price of decorticated cotton cake has been particularly high and a considerable saving was effected by those who purchased earthnut cake as the latter was obtainable at a more reasonable price

Another thing that should be observed in this connection is the tendency of the home-grown foods to be comparatively deficient in albuminoids but fairly rich in carbohydrates. Consequently it is advisable for the farmer as a rule to purchase a certain amount of foods containing a high percentage of albuminoids in order to make up well-balanced rations. When the bulky portion of the ration consists mainly or altogether of good hay this may not be a matter of great importance. But when cereal straws, containing as they do a high percentage of carbohydrates and only a relatively low amount of albuminoids, are largely used it is particularly necessary to avoid using large quantities of concentrated foods with low albuminoid content. Foods rich in albuminoids should be purchased to make up for the deficiency of the straw in this particular constituent. In this connection it should be clearly understood that the use of a badly-balanced ration involves a waste of food. The excess of any food constituent (albuminoid, oil or carbohydrate) which a ration contains is wasted, because it cannot be properly utilised by the animal.

If farmers generally were to appreciate the importance of providing animals with properly balanced rations they would not be satisfied with the particular concentrated foods which the merchants in many localities happen to keep in stock. When purchasing feeding stuffs the nature of the home-grown foods available and the type of stock to be fed should in the first place be considered. Then the market prices should be studied so as to insist upon the merchant supplying those particular foods whose prices at the time happen to be in favour of the buyer. By adopting this method of procedure rations might be better balanced, much less food would be wasted, and the feeding of animals would become much more profitable.

A particularly undesirable feature of feeding practices in Mid Wales is found to arise from a tendency on the part of farmers to form an exaggerated opinion of some one particular feeding stuff. For instance, one often meets farmers who endeavour to maintain that there is no feeding stuff to equal maize meal. They buy large quantities of that particular food but no other. Such a procedure, as a rule, means that much food is wasted because the rations are not properly balanced. What is true with regard to the excessive use of maize meal would, of course, apply equally well to the excessive use of earthnut cake, cotton cake or any other feeding stuff. In general a mixture of two or more concentrated foods is much more economical than any one meal or cake by itself. By providing a mixture of foods it is often easier to supply properly balanced rations. Further, the palatability and digestibility of foods may be favourably influenced by adopting a suitable mixture in the diet.

The following classification of foods according to their characteristic effect upon stock and butter may be of some guidance in making up suitable rations.

"Laxative" Foods.	Linseed, linseed cake, soya bean cake, oatmeal, wheat bean, treacle, turnips, swedes, mangolds, young pasture grass.
"Binding" Foods.	Cotton cake (especially when undecorticated), maize meal, wheat flour, hay, straw.
Foods producing hard butter.	Beans, peas, cotton cakes, palm kernel cake, cocoanut cake.
Foods producing soft butter.	Linseed cake, bran, maize meal, oats.

Although the general tendency with farmers within the College area is to supply stock with a smaller quantity of concentrated food than is desirable one often finds that certain classes of animals are over-fed. Such over-feeding is found to be practised more particularly with fattening animals and dairy cows supplying but small quantities of milk.

Assuming that the rations contain a fair supply of swedes, and that the bulky fodder supplied consists of hay and cereal straw in approximately equal quantities, the following amounts of concentrated foods per day may be recommended :—

Fattening cattle (two-year old).—6 to 8 lbs. concentrated food.

Dairy cows.—For a cow supplying two gallons of milk per day 5 lbs. concentrated food, and 2 lbs. more concentrated food for every additional gallon of milk supplied.

It is seldom profitable to supply any concentrated food to a cow when its daily yield of milk is only a few pints.

Compound Meals and Cakes.

In many districts compound feeding stuffs are purchased in considerable quantities. From time to time samples of several of these foods have been examined at the College laboratory. The results obtained clearly indicate that whereas many of them are satisfactory, both as regards nutritive value and market price, there are some which are inferior in composition and more especially much too expensive. One great disadvantage connected with the purchase of this class of concentrated food is that according to the Fertilisers and Feeding Stuffs Act the vendor is required to provide a guarantee of the composition only as regards the percentage of albuminoids and oil. The amount of carbohydrates present need not be stated. Of course, the same thing applies to the sale of such feeding stuffs as cotton cake, linseed cake, etc. ; but in the case of these foods it

is possible to ascertain, approximately, the amount of carbohydrate present by reference to a table of composition such as is provided in this leaflet. It is thus evident that on account of the uncertainty which often exists as to the amount of nutriment they contain, and the difficulty of ascertaining whether all the ingredients present are wholesome or otherwise, particular care should be exercised in purchasing this class of foods.

Abstracts.

A STUDY OF THE FECAL EXAMINATIONS OF 1,000 IMPORTED DOGS.

By MEYER WIGDOR, M.A.,
Junior Zoologist, Bureau of Animal Industry, Washington, D.C.

FOR a number of years, since January, 1911, the feces of imported dogs have been examined in this laboratory by various workers here, including Doctors Ransom, Hall, Graybill, and May, and by Messrs. Foster, Garlough, and Schwartz, and the writer. The findings have been summarised from time to time by Doctor Ransom in the Annual Reports of this Bureau, and were published in detail at an early date by Foster (1912).*

The fecal examinations were in compliance with Order No. 176 of the Bureau of Animal Industry, November 25, 1910, which requires that all collie or sheep dogs imported into this country be held in quarantine pending the results of a fecal examination. The object of the fecal examination is to prevent the importation into this country of such parasites as the gid tapeworm and the hydatid tapeworm, parasites injurious to live stock and to man. These dogs are held in quarantine until fecal examinations have been made, and the animals found free from dangerous parasites. Dogs are notorious carriers of parasites, and it is obviously undesirable to complicate the present problems of eradication and the application of prophylactic measures by importing fresh supplies. If a preliminary fecal examination shows the presence of *Tænia* eggs or proglottids, suitable anthelmintics are administered to remove the parasite before the animal is released from quarantine.

Data are now available on the fecal examinations of 1,000 imported dogs which have been examined from January, 1911, through July, 1919. The termination of the World's War gave a great impetus to

* Foster (1912). Analysis of the results of 87 fecal examinations of sheep dogs for evidences of parasitism. *Science*, n.s. (901), Vol. XXXV, pp. 553-554.

this importation of foreign dogs into this country, as the men who had seen service abroad in our army brought back considerable numbers, especially of the German sheep dog.

Among the breeds of dogs imported, the various breeds of sheep dogs were most numerous. They included the Belgian, English, German, French, Russian, and Dutch sheep dogs. Collies were next in number, and included the Scotch, Shetland, short-haired, and other breeds. German and Belgian police dogs were quite common, and there were also a limited number of wolf hounds.

In connection with these fecal examinations, the nature of the infestations with intestinal parasites is of interest. Of the 1,000 dogs examined, 540, or 54 per cent., were negative on fecal examination. Of the 460, or 46 per cent., that were infested, 258, or 26.8 per cent., were infested with ascarids, of which there were approximately three times as many *Toxascaris limbata* as there were *Belascaris marginata ;* 86, or 8.6 per cent., were infested with hookworm (probably *Ancylostoma canium* as a rule, but in some cases the species was probably *Uncinaria criniformis*) *;* 15, or 1.5 per cent., were infested with whipworm (*Trichuris depressiuscula*) *;* 36, or 3.6 per cent., were infested with *Dipylidium ;* 152, or 15.2 per cent., were infested with *Tænia ;* 1, or 0.1 per cent., were infested with flukes ; 1, or 0.1 per cent., were infested with a larval nematode, probably *Hæmostrongylus vasorum ;* and 1, or 0.1 per cent., were infested with a *Diphyllobothrium* sp. The dog infested with *Diphyllobothrium* was a Russian sheep dog and the worm on examination proved to be a different species than *Diphyllobothrium latum.*

Of the 152 dogs infested with tænioid cestodes, there were

68 infestations with *Tænia pisiformis,*
18 infestations with *Tænia hydatigena,*
15 infestations with *Multiceps serialis,*
1 infestation with *Multiceps multiceps.*

In 52 infestations with *Tænia,* the species was not determined.

Two dogs were infested with two species of worms, which accounts for the apparent total of 154 in this list.

The high percentage of dogs with negative fecal findings is perhaps associated with the fact that dogs valuable enough to import are usually well cared for and kept in cleanly surroundings. It is also true that a negative fecal examination is not entirely conclusive evidence of freedom from parasites. The absence of parasitic ova in the feces does not preclude the possibility of parasitic infestation, as many factors may account for the absence of the ova in the feces in spite of infestation. The low percentage of *Dipylidium,* hookworm,

and the especially low whipworm infestation is interesting in view of the fact that 30 to 50 per cent. of the dogs in most regions of the United States from which we have available data are infested with these worms. While a majority of the dogs imported into this country are free from intestinal parasites, so far as fecal examinations show, the occasional occurrence of such parasites as *Multiceps multiceps*, is evidence of the need for the quarantine and examination of imported dogs.—(*Journal of the American Veterinary Medical Association.*)

Parliamentary.

TUESDAY, JULY 13.

Conditions of Officers in R.A.V.C.

COLONEL SIR ARTHUR HOLBROOK asked the Secretary for War if any decision had yet been arrived at with regard to the conditions of half pay for officers in the Royal Army Veterinary Corps; what steps were being taken to reduce the surplus strength of major-generals in the Royal Army Veterinary Corps; and whether he was aware that there were two such officers surplus to establishment whose retention was retarding the promotion of junior officers; if the two major-generals surplus to the Royal Army Veterinary Corps establishment were paid as and reckoned on the list of colonels on the establishment of that corps; and, if so, why did they not receive similar treatment as regards the conditions of half pay as other colonels on the establishment?—Sir A. Williamson replied: The two major-generals referred to by the honourable and gallant Member were promoted substantive major-generals for distinguished service. They are not surplus to the establishment of the Royal Army Veterinary Corps, but are holding appointments as colonels, which they would have filled if they had not been promoted. Their retention is not, therefore, retarding the promotion of junior officers. I do not understand what conditions of staff pay for officers of the Royal Army Veterinary Corps the honourable and gallant Member refers to, but if he will let me have fuller details I shall be happy to look into the matter further.

Personal.

HIS MAJESTY THE KING OF ITALY has recently conferred the high honour of "Commendatore" of the Order of the Crown of Italy, also that of Cavalier of the Order of St. Maurice and St. Lazarus, upon

our distinguished Italian colleague, Professor Alfredo Bartolucci, Provincial Veterinary Surgeon (1st class) on the permanent staff of the Veterinary Public Health Service. The Service, which has its headquarters at Rome, and investigates and controls the measures adopted for the prevention and eradication of outbreaks of disease amongst animals. Professor Bartolucci, who will be recollected by some of those who served in Italy during the war, was the Secretary of the Commission who investigated the terrible epizootic of Foot and Mouth Disease in the cattle of Northern Italy in the spring of 1919. His friendship for his English colleagues was always well shown, and, like many other of our Allied confrères, he spared no trouble to give the British Veterinary Officer every help in his power to solve the numerous difficulties which naturally came in the path of those who were suddenly pitchforked into a strange country full of many diseases with which they had beforehand only a text-book acquaintance.

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Owing to the recent further increase in the cost of printing and paper, we are reluctantly compelled to advance the price of the VETERINARY JOURNAL *from* 1*s.* 6*d.*, *to* 2*s. per copy. The Annual Subscription will be* 21*s.*, *post free, instead of* 18*s.*, *and the annual combined subscription with the* VETERINARY NEWS *will be* 32*s.*, *post free. These revised rates to take effect as from July* 1, 1920.

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